INFOGRAPHHUB SERIES · 9 PARTS · AGES 11–16

The Solar System

Nine infographics that tour the Sun, the planets and the small worlds between them, from how it all formed to how we explore it.

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Each part is one printable infographic. Work through them in order, or use the part you need. The quiz answers are printed upside down at the foot of the quiz. Sources for every part are listed on its page at infographhub.com.

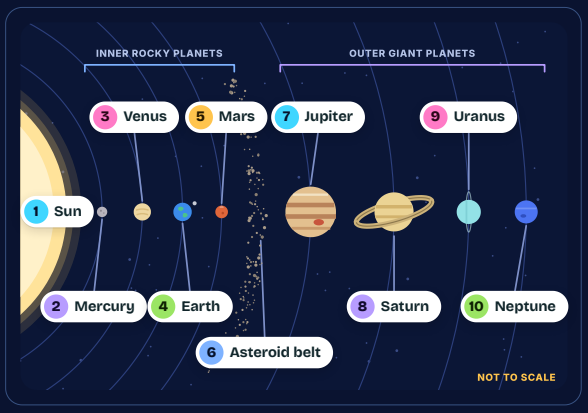
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THE SOLAR SYSTEM · PART 1 OF 9 · AGES 11–16

The Solar System Explained

The Sun and the eight planets that orbit it, in order from Mercury to Neptune, with the asteroid belt in between.



1 Sun

Our star, a huge ball of hot hydrogen and helium about 109 times wider than Earth. It holds 99.8% of the Solar System's mass, and its gravity keeps everything else in orbit.

2 Mercury

The smallest planet and the closest to the Sun. With almost no air to hold heat, its cratered surface reaches 430 °C by day and falls to −180 °C at night.

3 Venus

Almost the same size as Earth, but wrapped in thick clouds and carbon dioxide that trap heat. It is the hottest planet, and it spins slowly backwards.

4 Earth

Our home, the only world known to have life and oceans of liquid water on its surface. It has one natural satellite, the Moon.

5 Mars

A cold, dusty desert world. Iron minerals in its soil have rusted, which makes it look red. It has two small moons, Phobos and Deimos.

6 Asteroid belt

A wide ring of rocky and metal leftovers between Mars and Jupiter, including the dwarf planet Ceres. All of its asteroids together have less mass than our Moon.

7 Jupiter

The largest planet: a gas giant made mostly of hydrogen and helium, about 11 times wider than Earth. Its Great Red Spot is a storm bigger than our whole planet.

8 Saturn

A gas giant circled by bright rings made of billions of chunks of ice and rock. It has more known moons than any other planet.

9 Uranus

An ice giant tipped on its side, with a tilt of about 98°, so it seems to roll around the Sun. Methane in its air gives it a blue-green colour.

10 Neptune

The farthest planet, over 30 times as far from the Sun as Earth. This dark, cold ice giant is the windiest world in the Solar System.

Shrink the Sun to a football

If the Sun were a 22 cm football, Earth would be a 2 mm peppercorn about 24 m away, and Neptune would be about 700 m away. That is why no diagram can show the Solar System to scale.

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2. The Planets by the Numbers

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THE SOLAR SYSTEM · PART 2 OF 9 · AGES 11–16

The Planets by the Numbers

How far, how big, how long a year and how many moons: NASA's figures for the eight planets.

30 AU

is Neptune's average distance from the Sun, 30 times Earth's

1 AU is Earth's distance from the Sun, about 150 million km. Sunlight takes about 4 hours to reach Neptune.

8 min 20 s

is how long sunlight takes to travel 1 AU to Earth

Light covers about 300,000 km every second. It reaches Jupiter, 5.2 AU away, in about 43 minutes.

11×

Jupiter's width compared with Earth's: 142,984 km across

Mercury, the smallest planet, is 4,879 km wide, only about 0.38 times Earth's 12,756 km.

88 days

is one year on Mercury, the planet closest to the Sun

Neptune needs almost 165 Earth years for one orbit. Mars takes 687 days and Jupiter 11.9 years.

293

confirmed moons orbit Saturn, more than any other planet

NASA, August 2026. Jupiter has 115, Uranus 29, Neptune 16 and Mars 2. Mercury and Venus have none.

464 °C

average surface temperature on Venus, the hottest planet

Mercury is closer to the Sun but averages 167 °C. Venus's thick carbon dioxide air traps the heat.

9.9 hours

is how long Jupiter takes to spin once, the shortest day

Venus spins so slowly, and backwards, that sunrise to sunrise takes about 117 Earth days.

687 kg/m³

Saturn's average density, lower than water's 1,000 kg/m³

Saturn is the only planet less dense than water. Earth is the densest, at 5,514 kg/m³.

Moon counts change

Astronomers keep confirming small new moons, so moon counts go up. The numbers here are NASA's as of August 2026. Always give the date when you quote a moon count.

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3. Rocky Planets vs Giant Planets

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THE SOLAR SYSTEM · PART 3 OF 9 · AGES 11–16

Rocky Planets vs Giant Planets

Four small, solid worlds near the Sun and four huge worlds of gas and fluid farther out. Here is how they differ.

Rocky planets	Giant planets
WHICH PLANETS	
Mercury, Venus, Earth and Mars, also called the terrestrial planets	Gas giants Jupiter and Saturn; ice giants Uranus and Neptune
WHERE THEY ORBIT	
Inner Solar System, inside the asteroid belt: within about 1.5 AU of the Sun	Outer Solar System, beyond the asteroid belt: from about 5 AU to 30 AU
SIZE	
Small. Earth is the largest at 12,756 km across	Huge. Even Neptune, the smallest, is almost 4 times wider than Earth
MADE OF	
Rock and metal, with an iron-rich core. Dense: 3,900 to 5,500 kg/m^3	Mostly hydrogen and helium, or water, methane and ammonia. Low density: 690 to 1,640 kg/m^3
SURFACE	
Solid crust you could stand on, with craters, mountains and volcanoes	No solid surface. Gas gets thicker and hotter with depth until it acts like a liquid
MOONS AND RINGS	
Only 3 moons between them (Earth 1, Mars 2) and no rings	Over 450 known moons between them, and every one has rings

Gas giant or ice giant?

Jupiter and Saturn are mostly hydrogen and helium. Uranus and Neptune are smaller, and 80% or more of their mass is 'icy' water, methane and ammonia, as a hot, dense fluid around a rocky core.

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4. Moons, Dwarf Planets, Asteroids and Comets

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THE SOLAR SYSTEM · PART 4 OF 9 · AGES 11–16

Moons, Dwarf Planets, Asteroids and Comets

The Sun and eight planets are only part of the story. These are the other kinds of object in the Solar System.

Dwarf planets

Round worlds that orbit the Sun but share their orbit with other objects. Five are officially named: Ceres, Pluto, Haumea, Makemake and Eris.

Moons

Natural satellites that orbit planets, dwarf planets or asteroids. Jupiter's Ganymede is the largest, bigger than Mercury. Many are only a few kilometres across.

Asteroids

Rocky or metal leftovers from the birth of the planets. Most orbit in the main belt between Mars and Jupiter, which holds 1.1 to 1.9 million asteroids over 1 km wide.

Comets

Lumps of ice and dust a few kilometres wide. Near the Sun the ice turns to gas, making a glowing coma and tails that always point away from the Sun.

Kuiper Belt objects

Millions of icy bodies in a thick ring beyond Neptune, from about 30 to 50 AU. Pluto is the largest. Many short-period comets come from here.

Oort Cloud

A vast, distant shell of icy objects thought to surround the Solar System, from about 5,000 to 100,000 AU. Long-period comets fall in from here.

Meteoroids, meteors, meteorites

A meteoroid is a small space rock. When it burns up in Earth's air, the streak of light is a meteor. Any piece that reaches the ground is a meteorite.

Leftovers tell the story

Asteroids, comets and many meteorites have changed little since the Solar System formed 4.6 billion years ago. Studying them is like reading the planets' building instructions.

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5. How the Solar System Formed

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THE SOLAR SYSTEM · PART 5 OF 9 · AGES 11–16

How the Solar System Formed

Seven steps from a cold cloud of gas and dust to the Sun, eight planets and the leftovers we still find today.

1. **A cloud of gas and dust**
   About 4.6 billion years ago, a cold cloud of hydrogen, helium and dust began to collapse under its own gravity, possibly squeezed by shock waves from a nearby exploding star.

2. **Collapse and spin**
   As the cloud shrank, it heated up and spun faster, like a skater pulling in their arms. The spinning cloud flattened into a disc called the solar nebula.

3. **The Sun switches on**
   Most of the material fell to the centre. When its core became hot and dense enough, hydrogen began to fuse into helium and the Sun started to shine.

4. **Dust sticks together**
   In the disc, grains of dust collided and stuck, growing into pebbles, boulders and planetesimals kilometres wide. This building-up is called accretion.

5. **Rock inside, ice outside the frost line**
   Near the hot Sun only rock and metal stayed solid, building small rocky planets. Beyond the frost line ice froze too, so cores grew big enough to pull in gas: the giants.

6. **The gas is cleared away**
   After a few million years, radiation from the young Sun and nearby stars blew the remaining gas out of the disc. Solid bodies kept colliding and merging into planets.

7. **Leftovers remain**
   Pieces that never became planets survive as asteroids, comets and Kuiper Belt objects. Many are almost unchanged, so they show what the early Solar System was like.

We can watch it happen elsewhere
Telescopes see discs of gas and dust around very young stars. In the youngest star clusters, 80% or more of the stars have them, and the discs fade within a few million years, just as ours did.

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6. Exploring the Solar System: A Timeline

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THE SOLAR SYSTEM · PART 6 OF 9 · AGES 11–16

Exploring the Solar System

Nine firsts, from the first satellite to a telescope a million and a half kilometres from Earth.

4 Oct 1957

Sputnik 1, the first satellite

The Soviet Union launches the first artificial satellite. The beach-ball-sized sphere beeps out radio signals as it circles Earth, starting the space age.

13 Sept 1959

Luna 2 reaches the Moon

A Soviet probe hits the Moon, becoming the first spacecraft to reach another world. Weeks later, Luna 3 sends the first pictures of the Moon's far side.

14 Dec 1962

Mariner 2 flies past Venus

NASA's Mariner 2 makes the first successful visit to another planet. It finds that Venus is scorching hot under a thick carbon dioxide atmosphere.

20 July 1969

Apollo 11: people on the Moon

Neil Armstrong and Buzz Aldrin become the first people to walk on the Moon. Six Apollo crews land by 1972 and bring back rock and soil samples.

1977

Voyager 1 and 2 launch

Two probes set off on a grand tour of the giant planets. Voyager 2 is still the only spacecraft to visit Uranus and Neptune. Both now fly in interstellar space.

24 April 1990

Hubble Space Telescope

Space Shuttle Discovery carries Hubble into orbit about 500 km up, above the blurring air. Among many discoveries, it finds new moons around Pluto.

12 Nov 2014

Philae lands on a comet

ESA's Rosetta mission drops the Philae lander onto Comet 67P: the first landing on a comet. It bounces, then settles and sends back data.

14 July 2015

New Horizons flies past Pluto

NASA's New Horizons gives the first close-up view of Pluto, revealing mountains, glaciers, icy plains and a huge, pale heart-shaped region.

25 Dec 2021

James Webb Space Telescope

The largest space telescope yet launches on an Ariane 5 from French Guiana. From 1.5 million km away it studies the Universe in infrared light.

Still travelling

Voyager 1 crossed into interstellar space in August 2012 and is the most distant human-made object. Its radio signals, moving at the speed of light, now take almost a day to reach Earth.

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7. Solar System Myths and the Real Science

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THE SOLAR SYSTEM · PART 7 OF 9 · AGES 11–16

Solar System Myths

Eight things many people believe about the Sun, the Moon and the planets, and what scientists have found instead.

✕ MYTH **It is summer when Earth is closest to the Sun.** 1

✓ FACT Seasons come from Earth's 23.4° tilt. Earth is closest to the Sun in early January, during northern winter. The hemisphere tilted towards the Sun gets more direct light and longer days.

✕ MYTH **The Sun is yellow.** 2

✓ FACT Sunlight mixes all colours, which look white, as astronauts see from space. Air scatters blue light out of the beam, so the Sun looks yellow from the ground. 'Yellow dwarf' is just its class of star.

✕ MYTH **The Moon has a permanent dark side.** 3

✓ FACT The Moon spins once per orbit, so we always see the same side. The far side gets just as much sunlight: at new moon it is fully lit while the side facing us is dark.

✕ MYTH **Space is completely empty.** 4

✓ FACT Space is almost a perfect vacuum, but the Sun constantly blows out the solar wind, charged particles that pass the planets at about 400 km/s. There is also dust, light and cosmic rays.

✕ MYTH **Pluto was 'demoted' because it is too small to be a planet.** 5

✓ FACT In 2006 the IAU said a planet must orbit the Sun, be nearly round and have cleared its orbital zone. Pluto shares its zone with many Kuiper Belt objects, so it is a dwarf planet.

✕ MYTH **The asteroid belt is packed with rocks, so spacecraft must dodge them.** 6

✓ FACT The belt is mostly empty space. All its asteroids add up to only 3–4% of the Moon's mass. NASA's Lucy spacecraft never needs to fire its thrusters to avoid one while crossing it.

✕ MYTH **There is no gravity in space, which is why astronauts float.** 7

✓ FACT At the Space Station's height, Earth's gravity is still about 90% as strong as on the ground. Astronauts float because they are in free fall, falling around Earth with their spacecraft.

✕ MYTH **One day the Sun will explode like a supernova.** 8

✓ FACT The Sun is not massive enough to explode. In about 5 billion years it will swell into a red giant, then shrink to a white dwarf, a small, dense, slowly cooling star.

⚠ **Never look at the Sun**

Even though the Sun is really white, never look straight at it, through sunglasses, binoculars or a telescope. Its light can permanently damage your eyes in seconds.

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8. Solar System Key Terms

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THE SOLAR SYSTEM · PART 8 OF 9 · AGES 11–16

Solar System Key Terms

Sixteen words for describing the Solar System precisely, each with a short definition.

Distance and time

Astronomical unit (AU)	Earth's average distance from the Sun, about 149.6 million km. Used for distances inside the Solar System: Neptune is about 30 AU away.
Light-year	The distance light travels in one year: about 9.46 trillion km. It measures distance, not time, and is used for distances to stars.
Orbital period	The time a body takes to go once around what it orbits: a planet's year. Earth's orbital period is 365.26 days.
Rotation period	The time a body takes to spin once on its axis. Earth's is about 23.9 hours; Jupiter's is under 10 hours.

Orbits and motion

Gravity	The pull between any two masses. It is stronger for bigger masses and weaker with distance. The Sun's gravity holds the planets in orbit.
Orbit	The curved path of one body around another, held by gravity. Planet orbits are ellipses: slightly stretched circles.
Perihelion and aphelion	The points in an orbit closest to and farthest from the Sun. Earth reaches perihelion in early January, about 147.1 million km away.
Axial tilt	The angle a planet's spin axis leans from upright relative to its orbit. Earth's 23.4° tilt causes the seasons; Uranus leans about 98°.

The Sun and its influence

Star	A huge ball of hot gas that makes its own light and heat. The Sun is our star; the nearest star system to ours, Alpha Centauri, is about 4.4 light-years away.
Nuclear fusion	Light atomic nuclei joining to make heavier ones, releasing energy. In the Sun's core, at about 15 million °C, hydrogen fuses into helium.
Solar wind	A stream of charged particles, mainly protons and electrons, blowing out from the Sun in all directions, at about 400 km/s near the planets.
Heliosphere	The vast bubble around the Solar System blown by the solar wind. Beyond its edge lies interstellar space, which both Voyager probes have reached.

Describing worlds

Planet (IAU, 2006)	A body that orbits the Sun, is massive enough to be nearly round and has cleared the neighbourhood around its orbit. There are eight.
Terrestrial planet	A rocky planet with a solid surface and a metal core, like Earth. Mercury, Venus, Earth and Mars are the terrestrial planets.
Natural satellite	A natural body that orbits a planet, dwarf planet or asteroid: a moon. Satellites built by people are artificial satellites.
Tidal locking	When a body spins exactly once per orbit, so the same face always points at the body it orbits. Our Moon is tidally locked to Earth.

AU or light-year?
Use AU inside the Solar System and light-years for stars. 1 light-year ≈ 63,000 AU, so even Neptune, at 30 AU, is only about 4 light-hours from the Sun.

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9. Solar System Quiz: Test Yourself

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THE SOLAR SYSTEM · PART 9 OF 9 · AGES 11–16

Solar System Quiz

Ten questions on the whole series. Answer them all, then turn the page round to check.

1 **Which planet is fourth from the Sun, just before the asteroid belt?**

- A Earth
- B Mars
- C Jupiter
- D Venus

2 **What is one astronomical unit (AU)?**

- A The distance light travels in a year
- B Earth's average distance from the Sun
- C The width of the Sun
- D The distance from Earth to the Moon

3 **According to NASA (August 2026), which planet has the most confirmed moons?**

- A Jupiter
- B Uranus
- C Saturn
- D Neptune

4 **Which of these is a rocky (terrestrial) planet?**

- A Neptune
- B Saturn
- C Uranus
- D Venus

5 **Which of these is a dwarf planet found in the asteroid belt?**

- A Ceres
- B Pluto
- C Eris
- D Ganymede

6 **Why did the giant planets form far from the Sun?**

- A Gravity is stronger far from the Sun
- B Beyond the frost line, ice could freeze
- C The Sun pushed all the gas outwards
- D They were captured from another star

7 **Which spacecraft is the only one to have flown past Uranus and Neptune?**

- A Voyager 1
- B Voyager 2
- C New Horizons
- D Hubble

8 **Earth is closest to the Sun in early January. What really causes the seasons?**

9 **Pluto orbits the Sun and is round. Which part of the IAU's 2006 planet definition does it fail?**

10 **What is the difference between a meteor and a meteorite?**

ANSWERS

1. B: Mars
2. B: Earth's average distance from the Sun, about 150 million km
3. C: Saturn, with 293 (Jupiter has 115)
4. D: Venus (the others are giant planets)
5. A: Ceres (Pluto and Eris are beyond Neptune; Ganymede is a moon)
6. B: Beyond the frost line ice froze too, so cores grew big enough to pull in gas
7. B: Voyager 2 (Uranus in 1986, Neptune in 1989)
8. Earth's 23.4° tilt: the hemisphere leaning towards the Sun gets more direct light and longer days.
9. It has not cleared the neighbourhood around its orbit: it shares it with many Kuiper Belt objects.
10. A meteor is the streak of light as a space rock burns up in the air; a meteorite is a piece that reaches the ground.

SERIES COMPLETE

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